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Report CO-002

Test Anxiety, Stress, and Social Support

Irwin G. Sarason
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March 2, 1981

Technical Report

Approved for Public Release

Prepared for:

OFFICE OF NAVAL RESEARCH
800 North Quincy Street
Arlington, Virginia 22217

This program was sponsored by the Organizational Effectiveness Research
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Three experiments were carried out dealing with the relationships among test anxiety, stress, and social support. In the first experiment, social support was defined in terms of the opportunity for social association with peers. In the second, it was defined as contact with an experimenter who displayed acceptance and empathy. The dependent measure was the ability to solve difficult intellectual problems. In the third, measures of both performance and self-preoccupation were obtained for groups differing in		


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ABSTRACT

access to social association. Social support had an especially positive effect on the performance of highly test anxious subjects and seemed to reduce self-preoccupation. The results were discussed in terms of the role played by social support in the ability to cope with stress.

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Recent discussions of stress have emphasized the role of social support which has frequently been defined as the existence or availability of people with whom one can associate and on whom one can rely. From this perspective, people who believe they belong to a social network of communication and mutual obligation experience social support (Cobb, 1976; Henderson, 1980). It is possible that social support facilitates coping with stress and adaptation to change. Its absence or withdrawal may have a negative effect. In this regard it is interesting that soldiers, many of whose buddies have been killed in combat, are more likely to develop combat exhaustion than soldiers who belong to intact units.

Bowlby (1969, 1973), after an extensive review of the literature, concluded that human beings of all ages are at their happiest and most effective when they are confident that there are trusted persons behind them who will come to their aid should difficulties arise. Such trusted persons provide a secure base from which to operate and constitute social support for the individual. He cites the example of the young child whose exploratory behavior ranges widely as long as mother's whereabouts are known and whose anxiety and timidity increase in her absence. According to Bowlby, self-reliance and a problem solving approach to stress grow and express themselves in an atmosphere of positive attachments and a belief that one is accepted as a worthy person. While Bowlby's attachment theory has had its greatest impact among developmental psychologists, it also has implications for the experimental study of personality, particularly concerning the problem of how people cope with stress.

While methodological rigor has not marked the literature on social support, there is evidence that certain types of social ties may have a protective, stress-buffering effect and that their effect may be more important

for some individuals than others. However, at the present time, neither the situations and circumstances conducive to a social support effect nor the mechanisms by which such an effect comes about can be specified. A variety of research approaches is needed to achieve this specification. Experimental studies could be especially helpful by providing information about the behavioral effects of particular social support manipulations.

This paper describes three experiments in which social support, operationally defined in two different ways, was related to intellectual performance. Each experiment included an individual difference variable, test anxiety. Previous research had shown that highly test anxious people perform relatively poorly under an evaluative condition and that their performance is hindered by excessive self-preoccupations concerning their failure and its consequences (Sarason & Stoops, 1978). All subjects performed on a difficult anagrams task either under a neutral or experimental condition. The experimental condition emphasized that ability to solve the anagrams was related to intelligence and likelihood of success in doing college-level academic work.

Sarason (1978) has interpreted anxiety in terms of self-referent preoccupations that direct attention from the task at hand to personal worries about perceived inefficacy. Prior learning and cognitive styles influence whether a given stressor will lead to task-relevant activity or self-preoccupation. From this point of view, stress eventuates in anxiety when the individual (1) lacks coping responses needed to deal forthrightly with a call for action, that is, a situational demand, constraint, or opportunity, and (2) is preoccupied with thoughts of self-doubt, self-debasement, and feelings of inadequacy. For the test anxious person, these preoccupations are especially strong in situations that have evaluative connotations.

The results of the experiments reported here bear on the question: Does social support have anxiety-reducing properties? According to Freud's theory, feeling isolated in a situation of perceived danger is especially conducive to the experience of anxiety. If this theory is correct, social support, and concomitant reduction of the sense of isolation, should contribute to a stress-buffering effect.

Experiment I

Four variables were studied in the first experiment: (1) individual differences in test anxiety, (2) sex, (3) the evaluative character of the situation in which the subject performed, and (4) social support. On the basis of previous research (Sarason, 1980), it was expected that stress-arousing conditions would be more detrimental for high than for middle and low test anxious groups. In addition, it was hypothesized that social support would be relatively more facilitative for highly anxious than for less anxious subjects. It was expected that highly test anxious subjects under stress-arousing conditions who received social support would perform at a higher level than highly test anxious, stressed subjects not exposed to support.

Method

Subjects

One hundred and ninety-two University of Washington undergraduates participated in the study. Assignment of subjects to experimental conditions was random, with the restriction that there be 8 subjects in each cell of the analysis of variance design.

Prior to and independent of the experiment, a large group of students took the Test Anxiety Scale (TAS) (Sarason, 1972, 1979). In the present experiment, subjects in the high and low TAS groups had, respectively, scores

in the upper and lower twenty-five percent of the score distribution. The middle TAS subjects had scores in the middle fifty percent of the score distribution. High TAS subjects had scores of 22 and above; middle TAS subjects had scores between 11 and 22; and low TAS subjects had scores of 10 and below.

Procedure

Included in the experiment were two individual difference variables, test anxiety and sex, and two experimental variables, achievement-orienting or stress-arousing instructions given prior to subjects' performance and a social support condition.

The task on which subjects performed was solving difficult anagrams. The thirteen anagrams were ones used earlier by Sarason (1961). Using group administrations, the time limit was eighteen minutes and the dependent variable was number of correct solutions. All subjects received the following instructions:

On the next page you will see a series of disarranged words. Your job will be to rearrange each group of letters so that they make a meaningful English word. Start when you are so instructed. Stop at the stop signal. Write your name at the top of the next page when given the signal.

The following statement was included on the first page of the test booklet for subjects who received the stress-arousal condition:

Ability to organize material such as the letters on the next page has been found to be directly related to intelligence level. High school students of above average intelligence (I.Q. greater than 100) and most college students should be able successfully to complete the task. You will have 18 minutes in which to complete it.

The first page of the test booklets given to control subjects included the following statement:

Most of you probably have worked anagrams. The task on the next page works the same way. These anagrams, however, are harder than most you have seen in books and magazines. Consequently, you may not finish all of them and you may find some of the anagrams very difficult. If this happens, don't worry about it. No one will find the anagrams easy.

Previous studies have found that the stress-arousal and control instructions interact with test anxiety in influencing performance and that the stress-arousing instructions have face validity for subjects with the sorts of tasks used in this experiment (Sarason, 1978, 1980; Sarason & Stoops, 1978).

The second experimental variable was the opportunity for social support. Half the subjects did not engage in a pre-performance activity. They performed only on the anagrams. Subjects under the social support condition were told they would perform in two unrelated experiments and participated also in a prior twenty-minute group discussion. The discussion was attended by six subjects who were asked to discuss a series of questions about their academic experiences.

"We are bringing together groups of students to discuss the problem of anxiety and worry over exams. Typically students suffer in silence and keep their academic concerns to themselves. As a result, there isn't much opportunity for sharing views and joining together socially to identify problems and consider possible solutions. That's unfortunate because it helps to be aware of what we have in common.

"While I will ask you to talk about some specific topics, how you approach them in this discussion will be up to you. From past experience, I know that the twenty or so minutes we have for discussion is often not enough. If that happens, you might want to continue on your own later on."

The subjects were asked to give their names and briefly introduce themselves. Following this the experimenter said:

"Let's start with the most basic questions. Are stress and anxiety about exams important problems here at the University of Washington?"

Other questions that were posed were:

"How often do you share your worries about tests with other students?"

"What are the barriers to this sharing of personal concerns?"

"What steps might be taken at the University of Washington to lower tension levels about academic standing?"

"Do you think discussions such as we have had are useful?"

"Do you feel this discussion has brought you closer to people who otherwise would just be 'other' students?"

Except for suggesting the specific topics, the discussions were free-wheeling. All groups discussed all topics and the amount of time devoted to the several topics seemed roughly comparable across groups. In addition to the six subjects, two confederates were present at the discussions. Their roles were to (1) stimulate discussion and keep it going if necessary, (2) positively reinforce comments made by participants and build group feeling and a sense of sharing, and (3) at the end of the discussion to say that the discussion had been valuable for them, comment on the degree of compatibility among the group members and suggest that the members get together after completion of the experiment to see if an informal meeting could be arranged for continuing discussion. This condition was designed to heighten the sense of social association and shared values among group members.

At the end of the discussion period one of the confederates commented:

"I can only speak for myself, but I really appreciated this chance to get to know some students who are more like me than I would have thought. Would any of you like to get together again in the next day or so?"

[At least other confederate would say "Yes."] Well, why don't we meet for a minute after the second experiment is over and see if we can set up a time and place to get together."

In every case, the group members agreed to meet briefly at the conclusion of the second experiment to set up a meeting. Pilot work on the social support manipulation and informal comments by subjects at the end of the experiment suggested that they valued the opportunity to share experiences and opinions with peers.

As each group discussion came to an end, the experimenter said:

"I hope you don't mind having two experimenters. We are doing different things, but it seemed a good idea to share you for this hour."

This was said cheerfully and with a smile. The second experimenter then entered the room and the first experimenter left.

Results

The results were analyzed using a 3 X 2 X 2 X 2 analysis of variance design encompassing test anxiety, stress arousal, social support, and sex. There were eight subjects per group. None of the F s involving the sex factor reached statistical significance.

One main effect, that for social support, yielded a statistically significant result ($F(1, 168) = 5.60, p < .02$). Subjects who participated in the group discussions performed at a higher level ($\bar{X} = 4.99$) than did those who did not ($\bar{X} = 4.28$).

Consistent with findings of previous research, there was a significant Test Anxiety X Stress interaction ($F(2, 168) = 5.30, p < .01$), with the high TAS subjects performing more poorly under the condition which emphasized the evaluative aspect of subjects' performance. Table 1 presents the means and

Table 1

Mean Number of Correct Anagram Solutions and Standard Deviations for Groups
Involved in Test Anxiety X Stress Interaction (N=32 per group) (Experiment I)

Instructions	Test Anxiety					
	High		Middle		Low	
	M	SD	M	SD	M	SD
Stressful	4.46	2.55	5.21	1.94	4.96	2.02
Control	5.31	2.16	3.78	1.82	4.06	1.92

standard deviations for the groups involved in the interaction. It shows that while the middle and low TAS groups performed at relatively low levels under the control condition, the high TAS subjects under the same condition performed well. Achievement-orienting instructions seem to increase the performance levels of low and middle test anxious subjects and decrease the performance of those high in test anxiety.

Of particular interest was the Test Anxiety X Social Support interaction ($F(2, 168) = 4.46, p < .01$). Comparisons for each of the three levels of test anxiety yielded a significant difference between the social support experimental and control groups only for high TAS subjects ($F(1, 62) = 13.00, p < .001$). Table 2 presents the means and standard deviations for the groups involved in the Test Anxiety X Social Support interaction.

Although the TAS X Stress X Social Support interaction only approached a statistically significant level ($F(2, 168) = 2.08, p < .13$), for subjects in the high test anxiety group who received the evaluative instructions, those who also participated in the group discussions performed on the anagrams at a higher level than those who did not ($F(1, 30) = 4.25, p < .05$).

Discussion

The social support manipulation appears to have played an important role in influencing this experiment's results. However, the test anxiety groups apparently did not have an equal need for social association. While the high test anxious group benefited from this condition, the low test anxiety group seemed unaffected by it.

Table 2

Mean Number of Correct Anagram Solutions and Standard Deviations
for Groups Involved in Test Anxiety X Social Support Interaction
(N=32 per group) (Experiment I)

Conditions	Test Anxiety					
	High		Middle		Low	
	M	SD	M	SD	M	SD
Social Support	5.88	2.27	4.50	1.97	4.59	2.30
Control	3.91	2.10	4.50	2.08	4.44	1.70

Anxiety has been characterized as a self-preoccupying reaction to stress (Sarason, 1978). Among the hallmarks of anxiety are thoughts of personal inadequacy and helplessness. It seems possible that social support defined as association with others and hope of its continuation may reduce the potency of these thoughts for anxious people even when the threat of evaluation is present.

Experiment II

In Experiment I, social support was defined in terms of group association. Experiment II explored another dimension of social support, acceptance, which was provided vicariously for half the subjects. Whereas in Experiment I support came from association with peers, in Experiment II it was communicated by an authority figure. The task was the same as the one used in Experiment I.

Method

Subjects

The subjects were eighty University of Washington undergraduates (forty males; forty females) who, prior to and independent of the experiment, had taken the TAS in a group administration. The high and low TAS groups were drawn from the upper and lower quartiles of the score distribution. High TAS subjects had scores of 22 and above; low TAS subjects had scores of 10 and below.

Procedure

There were four experimental conditions. Two of these, the stress-arousal and control conditions, were similar to conditions employed in Experiment I. The acceptance condition was created by having a confederate raise his hand after the experimenter had introduced the anagrams task and say, "I don't think I can work these problems. They get me all upset. I'm no good at them." The experimenter responded with, "You're not the only person who clutches up

in this kind of situation. I can tell from the fact that you took the initiative to tell me how you feel that you're an intelligent person. Just do your best. That's all anybody can expect. I think you have more ability than you give yourself credit for."

The fourth condition was a combination of the acceptance and stress-arousal conditions.

Results

A 2 X 2 X 4 analysis of variance was performed on the number of correct anagram solutions. There were no significant F s that involved the sex variable. The result for experimental conditions was significant ($F(3, 56) = 3.10, p < .05$) and attributable to the superiority of the two conditions in which social support was provided (Newman-Keuls Test, $p < .05$). Table 3 gives the means and standard deviations for the groups defined by level of TAS and experimental conditions. The significant TAS X Conditions ($F(3, 56) = 4.89, p < .01$) reflected the superiority of the high to the low TAS groups under the acceptance condition and the superiority of the low to the high TAS under the stress-arousal condition.

In order to obtain information on the face validity for subjects of the two experimental manipulations, as many of the subjects as possible were contacted for telephone interviews six to seven weeks after participation in the experiment. They were asked to describe what had happened in the experiment, what the experiment was about, and what they especially liked or disliked about it. Telephone calls to 62 subjects were completed. While the N s in the eight cells of the research design varied and while no quantitative data, such as rating scale responses were obtained, a few strong patterns

Table 3

Mean Number of Anagram Solutions and Standard Deviations as a Function
of Test Anxiety and Acceptance (N=10 per group) (Experiment II)

Test Anxiety	Conditions							
	Evaluative Instructions		Acceptance		Evaluative Instructions & Acceptance		Control	
	M	SD	M	SD	M	SD	M	SD
High	2.88	1.62	6.50	1.73	5.00	1.10	3.75	1.79
Low	5.38	1.97	4.38	1.50	4.75	1.92	3.75	1.20

emerged. Of the 34 subjects who received evaluative instructions, 26 described the experiment as one in which they had taken a test. Of the 28 subjects who did not receive evaluative instructions, only 10 said something that approximated, "I took a test." Both the groups that received the evaluative instructions alone and the group that received these instructions plus the acceptance condition described the experiment as one in which a test had been taken. Of the 32 contacted subjects who received the acceptance condition, 17 made special mention of the experimenter's positive qualities ("He was thoughtful." "He was a nice guy." "I liked him."). One of the 13 control subjects made a comment of this type, and one subject in the evaluative condition made such a comment. High test anxious subjects in the acceptance conditions tended to say more positive things about the experimenter than did low scorers.

Discussion

The acceptance condition in this experiment influenced problem solving performance by itself and in interaction with test anxiety. Two features of the results seem especially interesting. One is the special benefits highly test anxious subjects seemed to derive from social support. The other is the fact that when combined with the achievement-orienting instructions, the support condition seems to have counteracted the negative effect these instructions usually have on people high in test anxiety (Sarason, 1978).

What was the nature of the support provided in Experiment II? The intention had been to create a condition in which subjects could observe a peer who was listened to with respect and interest. The emphasis was on the experimenter's acceptance of and regard for the subject. This condition was based on the idea that when a person feels valued, anxious self-preoccupation decreases. Interpretation of this treatment is difficult because of the complexity of the experimental treatment. The subjects in acceptance groups

were exposed to an empathetic experimenter, but they were also given a communication that may have reduced the stressfulness of the testing situation. Thus, the results might be attributable as much to the experimenter's message as to the feeling tone with which it was delivered. Research aimed at separating these factors is needed.

Experiment III

As an individual difference variable, test anxiety has been interpreted as the tendency to engage in self-preoccupying thought when confronted with test-like situations (Sarason, 1978, 1980). This self-preoccupying thought usually takes the form of worry, is not task-relevant, and as a consequence interferes with ongoing performance. In order to gather information about this idea, the third experiment emphasized as a dependent measure the Cognitive Interference Questionnaire (CIQ) (Sarason, 1978). The CIQ consists of eleven five-point rating scales that deal with self-preoccupying thoughts during performance on a task. Examples of the items, rated by the subject from "never" to "very often," are:

"I thought about how poorly I was doing."

"I thought about how often I got confused."

Previous research has found that highly test anxious subjects tend to show more cognitive interference under stress than do other subjects (Hollandsworth et al., 1979; Sarason & Stoops, 1978).

The experiment was essentially the same as Experiment I. It was predicted that high TAS subjects under achievement-orienting conditions would have higher CIQ scores than low TAS subjects and that the social support condition would reduce the tendency to become self-preoccupied.

Method

Subjects

The subjects were 40 male and 40 female University of Washington undergraduates. High TAS subjects had scores of 22 and above, and low scorers had scores of 10 and below. The subjects were drawn from the upper and lower quartiles of a large group of students who took the TAS prior to and independent of the experiment.

Procedure

The procedure was the same as the one used in Experiment I, with stress-arousal and social support manipulated in the same ways as in that experiment. The design was a $2 \times 2 \times 2 \times 2$ analysis of variance, encompassing test anxiety, stress-arousal, social support, and sex. There were 5 subjects in each of the cells.

Results

As in Experiment I, the sex variable was not involved in statistically significant results. The main effect for social support was statistically significant ($F(1, 64) = 4.02, p < .05$). Subjects who participated in the group discussions performed at a higher level ($\bar{X} = 4.82$) than did those who did not ($\bar{X} = 4.32$). The TAS \times Stress interaction was also significant ($F(1, 64) = 4.10, p < .05$) with high TAS performing more poorly ($\bar{X} = 3.38$) under the stress-arousal condition than did low TAS subjects ($\bar{X} = 5.80$). The control group means were 4.42 and 4.58 for the high and low TAS groups, respectively. The Test Anxiety \times Social Support interaction was also significant ($F(1, 64) = 4.12, p < .05$). Table 4 shows the means for this

Table 4

Mean Numbers of Correct Anagram Solutions and Cognitive Interference
Questionnaire (CIQ) Scores for Test Anxiety X Social Support
Interactions (N = 20 per group) (Experiment III)

Conditions	Test Anxiety			
	High	Low	High	Low
	Anagrams		CIQ	
Social Support	5.67	4.20	22.34	21.62
Control	4.33	4.11	27.39	22.14

interaction, for both anagram and CIQ scores. The TAS X Stress X Social Support interaction was not statistically significant. However, for high test anxious subjects who received the evaluative instructions, those who also participated in the group discussions ($\bar{X} = 4.11$) performed at a higher level than those who did not ($\bar{X} = 2.68$) ($F(1, 18) = 4.62, p < .05$).

The results for the CIQ were, in certain respects, mirror images of the results for anagrams. The TAS X Stress interaction was significant ($F(1, 64) = 4.14, p < .05$). The mean CIQ score for the high TAS-stress group was 29.44 and the high TAS-non-stress group was 20.79. The mean was 20.91 for the low TAS-stress group, while the low TAS-non-stress group mean was 22.85. High TAS-stress subjects performed at a lower level than did subjects in other groups and reported more self-preoccupation. The TAS X Social Support interaction for the CIQ was also significant ($F(1, 64) = 4.19, p < .05$). This effect was due to lower CIQ scores for the high TAS-social support condition ($\bar{X} = 22.84$) than for the high TAS-non-support condition ($\bar{X} = 27.39$). The low TAS-social support mean was 21.62 and the low TAS-non-support mean was 22.14 (see Table 4). The TAS X Stress X Social Support effect ($F(1, 18) = 4.48, p < .05$) was attributable to a higher mean CIQ score for high TAS-stress-non-social support group (34.53) than for the high TAS-stress-social support (26.35) group. The high TAS-stress-non-social support group, then, seemed both to perform relatively poorly on the anagrams and report a high level of cognitive interference. The high TAS-stress-social support group performed relatively well and reported less cognitive interference.

Discussion

This experiment was carried out to (1) assess the effects of social support on performance, and (2) obtain clues to the mechanism involved in differences attributable to social support manipulations. Underlying the experiment was

evidence from previous research that highly test anxious people perform relatively poorly in the presence of evaluative stressors. Because social support might serve as a buffer against the effects of stress, this variable was studied experimentally.

Of major interest in Experiment III was the way in which self-preoccupation as measured by the Cognitive Interference Questionnaire varied as a function of test anxiety, stress, and social support. For highly test anxious subjects under evaluative stress, performance was relatively poor and self-preoccupation relatively high. On the other hand, social support facilitated the performance of highly test anxious subjects and seemed to reduce cognitive interference. Thus, the two experimental manipulations, evaluative stress and social support, seemed to influence the self-preoccupation of persons high in test anxiety. The performance and self-preoccupation of low test anxious subjects did not seem to be influenced appreciably by the experimental manipulations. Since the CIQ was administered after the anagrams, it is possible that subjects may have inferred disruptive self-preoccupying thoughts from their poor performance or have reported self-preoccupying thoughts as a means of justifying their lower performance.

The results of the three experiments reported are consistent with the idea that the problem of anxiety is, to a significant extent, a problem of interfering cognitions and the direction of attention. Stress becomes maladaptive when it evokes, in susceptible individuals, self-preoccupying thoughts that interfere with attention to the environment and to tasks that must be dealt with. Social support may be effective because the presence of an interested other shakes the individual's assumption that he or she must face a challenge alone.

A supportive environment may exert its impact on behavior by strengthening what Bandura (1977) calls self-efficacy and White (1959) calls effectance motivation. High anxiety and low self-efficacy can be either specific to a

particular situation, such as academic performance, or pervade many aspects of life. The belief that others have similar interests and concerns and that help is available may contribute to the extinction of anxiety. Although it was not especially concerned with performance, Schachter's research suggests that social affiliation has anxiety-reducing effects (Schachter, 1959).

The series of investigations reported here represent only a beginning effort in the experimental study of social support. Indeed, it cannot be stated with certainty that this variable was the active ingredient in the treatment so-labelled. The concept of social support seems important, yet vague. Among the senses in which the term has been used are (1) affection (love, liking), (2) aid (material assistance, money), and (3) affirmation (acceptance, approval, recognition). Using this typology, the manipulations in the three experiments would seem to fall within the category of affirmation. However, as was mentioned earlier, the experimental manipulations were complex and further research is needed to operationalize and evaluate major components of social support.

While further research will be needed to clarify the dimensions of social support, the findings reported here suggest that the manipulations labelled as social association and acceptance do differentially affect groups varying in test anxiety levels.

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LIST 2
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Commanding Officer
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Psychologist
ONR Branch Office
536 S. Clark Street
Chicago, IL 60605

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Psychologist
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Washington, DC 20350

Deputy Chief of Naval Operations
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Director, Human Resource Management
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Washington, DC 20350

Deputy Chief of Naval Operations
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Head, Research, Development, and
Studies Branch (Op-102)
1812 Arlington Annex
Washington, DC 20350

Deputy Chief of Naval Operations
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Plans and Policy Branch (Op-150)
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Chief of Naval Operations
Head, Manpower, Personnel, Training
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Chief of Naval Operations
Assistant, Personnel Logistics
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Bethesda, MD 20014

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Navy Medical R&D Command
Bethesda, MD 20014

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Naval Postgraduate School
ATTN: Professor John Senger
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Commander in Chief
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Officer in Charge
Human Resource Management Detachment
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~~Human Resource Management School~~
Naval Air Station Memphis
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Orlando, FL 32813

Commanding Officer
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Orlando, FL 32813

Chief of Naval Education
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Newsport News Shipbuilding &
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LIST 9
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LIST 11
OTHER FEDERAL GOVERNMENT

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Educational Equity Grants Program
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National Institute of Education
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LIST 12
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